

Amendments to the Claims:

The listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

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1. (Currently Amended) A perpendicular magnetic recording medium comprising:
a nonmagnetic substrate;
an underlying film formed on said nonmagnetic substrate; and
a perpendicular magnetic layer formed on said underlying film,
wherein said underlying film has a layer exhibiting a super paramagnetism, and the magnetization of said layer exhibiting super paramagnetism is not larger than 20 emu/cm² when a magnetic field of 796,000 A/m is applied at 300K.
 2. (Currently Amended) The perpendicular magnetic recording medium according to claim 1, wherein said layer exhibiting a super paramagnetism is formed of ~~fine~~ particles exhibiting a super paramagnetism of a soft magnetic material.
 3. (Currently Amended) The perpendicular magnetic recording medium according to claim 1, wherein said layer exhibiting a super paramagnetism has a granular structure having ~~fine~~ particles exhibiting a super paramagnetism of a soft magnetic material dispersed in a nonmagnetic matrix.
 4. (Currently Amended) The perpendicular magnetic recording medium according to claim 1, wherein said layer exhibiting a super paramagnetism has a saturation magnetization under the following conditions: applied magnetic field not higher than 3980 A/m in respect of the order of 10⁻⁸ second corresponding to the magnetic field reversal time of a recording

head and the magnetization is not saturated under the following conditions: the applied magnetic field not higher than 796,000 A/m relative to the order of one second or more.

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5. (Currently Amended) The perpendicular magnetic recording medium according to claim 1, wherein said layer exhibiting a super paramagnetism exhibits a soft magnetic properties ~~under when~~ the temperature is not higher than 10K and exhibits a paramagnetism under the ambient temperature ~~around room temperature~~ conditions.

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6. (Original) The perpendicular magnetic recording medium according to claim 1, wherein the magnetization of said layer exhibiting a super paramagnetism is not saturated under the temperature around room temperature and under the applied magnetic field not higher than 796,000 A/m, and the layer exhibiting a super paramagnetism has a saturation magnetization under the temperature not higher than 10K and under the applied magnetic field not higher than 3980 A/m.

7. (Currently Amended) A perpendicular magnetic recording-reproducing apparatus comprising:

a perpendicular magnetic recording medium;

driving means for supporting and rotating the perpendicular magnetic recording medium;

a magnetic head including an element for recording information in the perpendicular magnetic recording medium and an element for reproducing the recorded information; and

a carriage assembly supporting said magnetic head which is movable relative to the perpendicular magnetic recording medium,

wherein the perpendicular magnetic recording medium comprises :

a nonmagnetic substrate,

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an underlying film formed on the nonmagnetic substrate and having a layer exhibiting super paramagnetism, and the magnetization of said layer exhibiting super paramagnetism is not larger than 20 emu/cm² when a magnetic field of 796,000 A/m is applied at 300K and a perpendicular magnetic layer formed on the underlying film.

8. (Currently Amended) The perpendicular magnetic recording-reproducing apparatus according to claim 7, wherein said layer exhibiting a super paramagnetism is formed of ~~fine~~ particles exhibiting a super paramagnetism of a soft magnetic material.

9. (Currently Amended) The perpendicular magnetic recording-reproducing apparatus according to claim 7, wherein said layer exhibiting a super paramagnetism has a granular structure having ~~fine~~ particles exhibiting a super paramagnetism of a soft magnetic material dispersed in a nonmagnetic matrix.

10. (Currently Amended) The perpendicular magnetic recording-reproducing apparatus according to claim 7, wherein said layer exhibiting a super paramagnetism has a saturation magnetization under the following conditions: the applied magnetic field is not higher than 3980 A/m in respect of the order of 10⁻⁸ second corresponding to the magnetic field reversal time of a recording head and the magnetization is not saturated under the following conditions: the applied magnetic field is not higher than 796,000 A/m relative to the order of one second or more.

11. (Currently Amended) The perpendicular magnetic recording-reproducing apparatus according to claim 7, wherein said layer exhibiting a super paramagnetism exhibits

a soft magnetic properties under the temperature not higher than 10K and exhibits a paramagnetism ~~under the~~ at ambient temperature ~~around room temperature~~.

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12. (Currently Amended) The perpendicular magnetic recording-reproducing apparatus according to claim 7, wherein the magnetization of said layer exhibiting a super paramagnetism is not saturated ~~under~~ when the temperature ~~around room temperature is~~ ambient and ~~when under~~ the applied magnetic field is not higher than 796,000 A/m, and the layer exhibiting a super paramagnetism has a saturation magnetization ~~under~~ when the temperature is not higher than 10K and ~~under~~ when the applied magnetic field is not higher than 3980 A/m.

13. (Previously Presented) The perpendicular magnetic recording medium according to claim 1 wherein said layer exhibiting super paramagnetism contains one soft magnetic material selected from the group consisting of FeTaC, FeZrO, CoFe, NiFe, CoZrNb, FeTaN, and FeZrN.

14. (Currently Amended) ~~The perpendicular magnetic recording medium according to claim 1,~~ A perpendicular magnetic recording medium comprising:

a nonmagnetic substrate;

an underlying film formed on said nonmagnetic substrate; and

a perpendicular magnetic layer formed on said underlying film,

wherein said underlying film has a layer exhibiting a super paramagnetism, and

wherein said layer exhibiting super paramagnetism has a magnetization not larger than 20 emu/cm² when a magnetic field of 796,000 A/m is applied at 300 K.

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15. (Currently Amended) The ~~perpendicular~~² perpendicular magnetic recording medium according to claim 2, wherein said fine particles has a particle diameter not larger than 40nm.

16. (Previously Presented) The perpendicular magnetic recording medium according to claim 3, wherein said nonmagnetic matrix contains one material selected from the group consisting of Ag, Ti, Ru, C, SiO₂, SiO, Si₃N₄, Al₂O₃, AlN, TiN, BN, CaF and TiC.

17. (Previously Presented) The perpendicular magnetic recording-reproducing apparatus according to claim 7, wherein said layer exhibiting super paramagnetism contains one soft magnetic material selected from the group consisting of FeTaC, FeZrO, CoFe, NiFe, CoZrNb, FeTa₂N, and FeZrN.

Same as claim 7
18. (Currently Amended) The ~~perpendicular magnetic recording-reproducing apparatus according to claim 7,~~ A perpendicular magnetic recording-reproducing apparatus comprising:

a perpendicular magnetic recording medium;
driving means for supporting and rotating the perpendicular magnetic recording medium;

a magnetic head including an element for recording information in the perpendicular magnetic recording medium and an element for reproducing the recorded information; and
a carriage assembly supporting said magnetic head which is movable relative to the perpendicular magnetic recording medium,

wherein the perpendicular magnetic recording medium comprises :

a nonmagnetic substrate,

an underlying film formed on the nonmagnetic substrate and having a layer exhibiting super paramagnetism, and

a perpendicular magnetic layer formed on the underlying film, and

wherein said layer exhibiting super paramagnetism has a magnetization not larger than 20 emu/cm² when a magnetic field of 796,000 A/m is applied at 300 K.

19. (Previously Presented) The perpendicular magnetic recording-reproducing apparatus according to claim 8, wherein said fine particles has a particle diameter not larger than 40nm.

20. (Previously Presented) The perpendicular magnetic recording-reproducing apparatus according to claim 9, wherein said nonmagnetic matrix contains one material selected from the group consisting of Ag, Ti, Ru, C, SiO₂, SiO, Si₃N₄, Al₂O₃, AlN, TiN, BN, CaF and TiC.
